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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/829,148	04/20/2004	Roger J. Malik	690-002	5092

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EXAMINER	
BUEKER, RICHARD R	
ART UNIT	PAPER NUMBER
1792	
MAIL DATE	DELIVERY MODE
12/10/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/829,148	MALIK, ROGER J.	
	Examiner	Art Unit	
	Richard Bueker	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 May 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4, 8-19, 21-24, 26-31, 40-59, 63-78, 81-83, 92-113, 115-131, 133-135 and 144-155* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,8-19,21-24,26-31,40-59,63-78,81-83,92-113,115-131,133-135 and 144-155* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claims 19, 101-113, 115-131, 133-135, 144-152, 154 and 155 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "nosecone" in claims 19, 101-113, 115-131, 133-135, 144-152, 154 and 155 is used by the claim to mean "conical outlet nozzle", while the accepted meaning is "a protective cone constituting the forward end of a rocket or missile." The term is indefinite because the specification does not clearly redefine the term.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 8-19, 29-31, 40-53, 55, 66-78, 81, 82, 92-107, 109, 115, 116, 118-131, 133-135 and 144-155 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito (JP 62-237721) taken in view of Sarraf (5,558,720), Zega (4,112,137), De Lange (2,508,500) and Dale (3,634,647), and in further view of Bennet (2,568,578) and Mercer (5,407,000), and optionally taken in further view of Colombo (5,827,371).

Saito (see the Fig.) discloses a liquid metal evaporation source for use in MBE process. Saito's apparatus includes an evaporator configured to evaporate liquid metal, a hollow reservoir, a hollow transport tube connecting the evaporator and reservoir, a conducting probe that determines the liquid level in the evaporator and provides feedback control to supply liquid metal from the reservoir to the evaporator, thereby keeping the liquid level in the evaporator at the desired level.

It is noted also that the evaporator of Saito includes a cone shaped source cell 12 which is located at the front end of the evaporation source, and therefore the cone cell can be interpreted to be a "nosecone" as claimed. As noted in the 35 U.S.C. 112, second paragraph rejection stated above, the metes and bounds of the term "nosecone" as used in the claims is unclear. If, for the sake of argument, however, the use of the word "nosecone" in the presently pending claims were considered to be limited to mean only "conical outlet nozzle", it would have been obvious to one skilled in the art to provide the MBE source cell of Saito with a conical outlet nozzle of the type taught by Colombo (see the conical nozzle in any one of Figs.1-18 of Colombo).

Sarraf also teaches a liquid metal evaporation source for use in MBE process that has an evaporator and supply reservoir analogous to that of Saito. Sarraf teaches the use of a heater for the supply reservoir to maintain the metal supply in a heated liquid form. It would have been obvious to one skilled in the art to provide the reservoir of Saito with a heater in view of Sarraf.

Zega (see Fig. 2, for example), De Lange (see Figs. 2 and 3, for example) and Dale (see Fig. 5, for example) all also disclose vaporizers of the type that are continuously supplied with liquid metal from a heated supply tank by pushing the liquid into the feed pipe. Zega teaches (see paragraph bridging cols. 6 and 7) that this type of recharging system can be applied to feeding any source of evaporation of relatively low melting point. Therefore, it would have been obvious to use this type of continuous supply for an MBE vaporizer of the type disclosed by Sarraf. Also, Zega and De Lange teach that such a supply system should be provided with a separate heater on the feed pipe. Also, De Lange (see element 11 of Fig. 2) and Dale (see col. 7, lines 14-19) teach that a piston in the supply tank can be used to push the liquid metal from the supply tank into the feed tube. It would have been obvious to use a separately heated feed tube and a piston to continuously supply an MBE evaporator of the type disclosed by Saito, because the secondary references teach that these expedients can successfully be used to continuously supply an evaporator as desired by Saito.

Also, Bennet (see Fig. 1, for example) and Mercer (see Fig. 1, for example) teach that a molten metal supply pipe should be provided with its own heater and thermocouple based heater control means, to make sure that the pipe is kept within a temperature range in which it will not become cool enough for the metal to solidify, and also will not become too hot (see Bennet at col. 1, lines 23-27, for example). It would have been obvious to one skilled in the art to provide the molten metal supply pipe of Saito, Zega, De Lange and Dale with its own heater and heater control, for

the desirable purpose of preventing both solidification and local over-heating, as taught by Bennet and Mercer.

Regarding the use of a liquid level conducting probe of the type taught by Saito to control a liquid supply piston via feedback control, De Lange (see Fig. 1 and col. 4, lines 38-44) teaches this type of level sensor for sensing the level in an evaporator. De Lange also teaches (col. 4, lines 55-60) that this type of level sensor can be used to control the movement of a piston feeder of the type shown in De Lange's Fig. 2. It would have been obvious to use this type of prior art liquid level sensor to control the liquid level in Saito's apparatus. Regarding the use of graphite (which is a refractory material) as recited in claim 3, Zega (col. 8, line 17) teaches that this is a material that can successfully be used for vapor sources. Also, regarding the newly added claim 3 limitation of "graphite having an efficient black-body radiation absorption", this is an inherent property of graphite and claim 3 as amended doesn't add other structural limitation to the claimed apparatus. Regarding claims 8 and 120, see Fig. 2 of De Lange. Also, any particular temperature or relative temperature recited in the present apparatus claims represents a recitation of intended use of the claimed apparatus and does not so limit the apparatus claims. Also, the use of flanges to connect machine parts along with nuts, bolts or champs would have been obvious to one of ordinary skill in the mechanical arts. Regarding newly added claims 153 and 154, the recited step of calculating "a maximum permissible gap" is a process limitation that does not so limit the present apparatus claims. It is noted also that reciting a step of calculating "a maximum permissible

gap" does not in any way limit the claimed apparatus to actually using the calculated "maximum permissible gap". A lesser gap can be used in the claimed apparatus without violating any requirement of claims 153 and 154.

Claims 4, 29-31, 51-54, 81-83, 99, 105-108 and 133-135 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito (JP 62-237721) taken in view of Sarraf (5,558,720), Zega (4,112,137), De Lange (2,508,500) and Dale (3,634,647) and in further view of Bennet (2,568,578) and Mercer (5,407,000)), and optionally taken in further view of Colombo (5,827,371) for the reasons stated above, and taken in further view of Chow (5,031,229) (see Fig. 1, for example) who teaches the use of pyrolytic graphite to form the heater elements on the outer surface of an evaporator. It would have been obvious to one skilled in the art to use the pyrolytic graphite heater of Chow as the heater of Saito because Chow teaches that his heater provides a more uniform temperature. Also, regarding the newly added claim 30 limitation of "graphite having an efficient black-body radiation absorption", this is an inherent property of graphite and claim 30 as amended doesn't add other structural limitation to the claimed apparatus.

Claims 21-24, 26, 27, 56-59 and 110-113 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito (JP 62-237721) taken in view of Sarraf (5,558,720), Zega (4,112,137), De Lange (2,508,500) and Dale (3,634,647) and in further view of Bennet (2,568,578) and Mercer (5,407,000), and optionally taken in further view of Colombo (5,827,371) for the reasons stated above, and taken in further view of Bahney (2,195,071) who teaches (see paragraph bridging pages 4 and 5) that a probe for detecting molten metal liquid level desirably should be provided with a ceramic

insulation coating, and he also teaches that the probe can be constructed of graphite, and it would have been obvious to incorporate these suggestions into the liquid level sensor suggested by De Lange. Also, regarding the newly added claim 22 limitation of "graphite having an efficient black-body radiation absorption", this is an inherent property of graphite and claim 22 as amended doesn't add other structural limitation to the claimed apparatus.

Claims 28, 63-65, 116 and 117 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito (JP 62-237721) taken in view of Sarraf (5,558,720), Zega (4,112,137), De Lange (2,508,500) and Dale (3,634,647) and in further view of Bennet (2,568,578) and Mercer (5,407,000), and optionally taken in further view of Colombo (5,827,371) and in further view of Bahney (2,195,071) for the reasons stated in the rejection above, and taken in further view of Komiyama (JP 53-019135), who teaches that a molten metal liquid level probe desirably can make electrical contact with a molten metal through the surface of the metal and through conductive walls of the molten metal container, and it would have been obvious to incorporate these suggestions into a liquid level sensor of the type suggested by De Lange.

Applicant has argued that Sarraf include a capillary feed tube. It is noted, however, that Sarraf has been replaced by Saito as the primary reference used in the rejection, and Saito uses a conventional pipe as the feed tube.

Applicant has argued that the purpose of his three different temperature is to use as little power as possible. As noted in the rejection above, however, any particular temperature or relative temperature recited in the present apparatus claims represents

a recitation of intended use of the claimed apparatus and does not so limit the apparatus claims.

Applicant has argued that the cited references fail to teach a "nosecone". It is noted, however, that where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "nosecone" in claims 19, 101-113, 115-131, 133-135, 144-152, 154 and 155 is used by the claim to mean "conical outlet nozzle", while the accepted meaning is "a protective cone constituting the forward end of a rocket or missile." The term is indefinite because the specification does not clearly redefine the term. Furthermore, it is noted also that the evaporator of Saito includes a cone shaped source cell 12 which is located at the front end of the evaporation source, and therefore the cone cell can be interpreted to be a "nosecone" as claimed. As noted in the 35 U.S.C. 112, second paragraph rejection stated above, the metes and bounds of the term "nosecone" as used in the claims is unclear. If, for the sake of argument, however, the use of the word "nosecone" in the presently pending claims were considered to be limited to mean only "conical outlet nozzle", it would have been obvious to one skilled in the art to provide the MBE source cell of Saito with a conical outlet nozzle of the type taught by Colombo (see the conical nozzle in any one of Figs.1-18 of Colombo).

Applicant has argued that none of the cited references teaches the use of heaters that emit infrared radiation. It is noted, however, that all heated objects inherently emit black-body radiation, which is infra-red radiation. All heaters inherently emit infra-red radiation, including all of the heaters used in all of the cited references. Note in particular that Dale teaches (see col. 6, lines 11-18, for example) that vapor source heaters can be chosen from thermal conduction or radiation heaters. From this teaching alone it would have been obvious to heat any of the parts of Saito's vapor source apparatus using a radiant heater that emits infra-red radiation.

Regarding the use of a thermocouple to control the temperature of a heater, Bennet and Mercer teach that a thermocouple can be used to control the temperature of a heater. In view of this teaching, it would have been obvious to one skilled in the art use a thermocouple as the thermal sensor 38 of Sarraf (see the Fig. and also col. 3, lines 47-49 of Sarraf). Furthermore, Sarraf teaches (see col. 3, lines 23-28) that it is desirable for the temperature of the molten metal reservoir 12 to be accurately maintained. Since Sarraf desires for his molten metal reservoir temperature to be accurately maintained, and Bennet and Mercer teach that a thermocouple can be used to accurately maintain the temperature of molten metal, then it would have been obvious to one skilled in the art to modify the apparatus of Sarraf by providing Sarraf's reservoir 12 with a thermocouple to ensure accurate temperature control of the reservoir 12 as desired by Sarraf.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Bueker whose telephone number is (571) 272-1431. The examiner can normally be reached on 9 AM - 5:30 PM, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Richard Bueker/
Primary Examiner, Art Unit 1792